MATING BEHAVIOR OF THREE SPECIES OF CONIOPTERYGIDAE (NEUROPTERA)[1]

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There have been very few reports of the mating behavior in Coniopterygidae. During the course of studying the biology of 3 species of coniopterygids in California we were fortunate in being able to observe several instances of courtship and mating behavior. These observations were fortuitous and made during field collecting. We were unable to observe mating under laboratory conditions.

Only 3 observations on mating behavior in Coniopterygidae have been reported in the literature. Collyer (1951) described a staggered, parallel, female-above position in *Conwentzia pineticola* Enderlein. He reported that in this species the male holds the hind coxae of the female with his forelegs and mouthparts. A similar staggered, parallel position was observed by Withycombe (1922) in *Parasemidalis annae*. Henry (1976) described a different type of mating behavior in *Aleuropteryx juniperi* Ohm — one in which the male and female mated in a tail-to-tail position.

We have observed courtship and mating in the following 3 species: *Conwentzia californica* Meinander, *Conwentzia barretti* (Banks) and *Semidalis angusta* Banks. Observations were made on newly-collected specimens in Los Angeles County, California.

Specimens were collected by aspirating adults into plastic 10-dram vials. During the course of field collecting, a vial would contain 15–20 adults. All observations on courtship and mating behavior were made in the vials within the first 2 hr following collection. After that time, continued observance of specimens did

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not reveal additional courtship and/or mating behavior. Mating was observed 3 times in both *C. californica* and *C. barretti* and 4 times in *S. angusta.*

Both sexes were observed to exhibit precopulatory behavior. The female would call by slightly elevating and rotating her abdomen and at the same time, fluttering her wings for 1–2 secs. This behavior was observed while the female was either walking or standing still and would be repeated at various time intervals for up to ca. 1 hr following collection. The male exhibited similar precopulatory behavior. He would elevate his abdomen dorso-anteriorly in a mating position, walk rapidly about and also flutter his wings intermittently for 1–2 secs.

The mating behavior of *C. californica, C. barretti* and *S. angusta* was very similar. The male approached the female from the rear and, with his head lowered, would push it up under the abdomen of the female. Simultaneously, the male reached forward with his forelegs and grasped the legs of the female. The male would grasp either 2, 3 or 4 legs of the female, excluding the forelegs which he could not reach. If only a single leg was grasped, the female would extricate herself from the male. The male would approach and grasp a female while she was either still or walking. It was not necessary that the female be quiescent. Males would occasionally approach a female from the side. These males would then quickly move to the posterior of the female and attempt to grasp her legs. Sometimes, the female would avoid the male by flying or walking rapidly away from a male after she had been approached. However, if the male was successful in grasping 2 or more legs, an attempt at copulation ensued.

Following the successful grasping of a female, the male then brought the tip of his abdomen dorso-anteriorly and made contact with the tip of the female abdomen. After aedeagal intromission, the mating pair remained *in copulo* for 10–15 min. The coital stance of the male was such that the abdomen was curved dorso-anteriorly almost to his metathoracic segment. The antennae of the male were extended outward at ca. 90° angle to the body and the wings were spread only slightly. After being successfully grasped, the female spread her wings to a ca. 45° angle to the body, the abdomen was elevated slightly and the antennae were in a porrect position.

During copulation, the female often walked around pulling the male with her. The genitalic grasp is sufficiently strong to maintain

union even when the adults were picked up by the wings with forceps. No postcoital courtship behavior was observed.

While a pair was *in copulo,* additional males sometimes approached. These males would locate the posterior of the mating pair, push under the male, grasp his legs and assume a coital stance. These secondary males would remain in this position for several mins. attempting to mate with the male. In one instance involving *C. barretti,* a third male joined "the chain" and attempted to mate with the second male.

During one collection period, several males and females of *S. angusta* and *C. californica* were in the same vial. Two males and one female of *C. californica* were observed exhibiting precopulatory behavior but no *S. angusta* were observed in this position. A male of *C. californica* then attempted to mate with the much smaller female of *S. angusta.* The male grasped 3 legs of the female and attempted unsuccessfully for ca. 45 min. to mate.

In another instance, 2 different males of *C. californica* grasped and attempted to mate with a male which had just concluded mating with a female. On yet another occasion, while collecting on *Cupressus semperiverns* L. in the Los Angeles State and County Arboretum, ca. 15 males were observed clustered and flying within 0.5 m of a female on a branch.

These observations seem to indicate the presence of a female sex pheromone. No mention of a female sex pheromone has previously been reported in the Coniopterygidae.

Mating has now been observed in 6 species of Coniopterygidae. The 3 species reported herein, in addition to *P. annae* and *C. pineticola,* all exhibit the staggered, parallel, female-above position. These 5 species are all within the subfamily Coniopteryginae. The one species having tail-to-tail mating behavior, *A. juniperis,* is in the subfamily Aleuropteryginae. Perhaps additional observations on other species will indicate that mating behavior is a distinguishing subfamily characteristic.

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